

SECTION 16010
ELECTRICAL GENERAL PROVISIONS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. The General Conditions, Supplementary General Conditions, and Special Conditions of this Contract form a part of this Division of Specification.
- B. This section forms a part of all sections under Division 16 Electrical.
- C. Requirements herein augment or clarify articles specified under aforementioned General and Special Conditions.

1.2 QUALIFICATIONS FOR BIDDERS

- A. Before submitting bid, visit the site and examine all adjoining existing equipment and space conditions on which work is in any way dependent, for the best workmanship and operation according to the intent of specifications and drawings. Report to the Engineer any condition which might prevent the installation of the equipment in the manner intended.

1.3 CODES AND STANDARDS

- A. Latest effective publications of following standards, codes, etc., as they apply, form part of these specifications as if were written fully herein and constitute minimum requirements. Minimum requirements shall not relieve the Contractor of the responsibility of furnishing and installing higher grade materials and workmanship than herein specified. The following will be referred to throughout in abbreviated forms.
 - 1. National Electrical Code, (NFPA 70) (NEC)
 - 2. Standard Rules of Institute of Electrical and Electronic Engineers (IEEE)
 - 3. Rules and Regulations of Local Electric Utility Company
 - 4. Applicable Standards of the National Electrical Manufacturer's Association (NEMA)
 - 5. Applicable Standards of the American National Standards Institute (ANSI)
 - 6. Applicable Local Codes
 - 7. Virginia Uniform Statewide Building Code 2006
 - 8. Applicable Standards and Lists of the Underwriter's Laboratories, Inc. (UL)
 - 9. Applicable Standards of the National Fire Protection Association (NFPA)
 - 10. International Building Code (IBC) 2006

11. The Americans with Disabilities Act (ADA)
12. International Electrical Testing Association (NETA)

1.4 SCOPE OF WORK

- A. Provide all work required for this Division including all labor, materials, equipment, appurtenances and services to provide complete electrical systems as shown on the drawings and specified in this Division of the specifications. The word "Provide" shall mean "Furnish and Install Complete and Ready for Use". The work includes, but is not limited to the following:
 1. Interior and exterior electrical lighting system including fixtures, lamps, time switches, photoelectric cells, contactors and other control devices and equipment.
 2. Power wiring system, including outlets, receptacles, switches, wire, conduit, junction boxes, panelboards, switchboards and modified electric service.
 3. Disconnect switches and power wiring up to and including motor connections for all equipment provided under other Divisions of this specification shall be included in this Division. Where manual motor control switches for single phase motors are indicated, they shall be provided and wired complete under this Division. Motor controllers and motor starters furnished under other Divisions shall be set in place and connected to source and load under this Division. In general, motors will be provided with the equipment they drive and are not part of this work under this Division, except that they shall be connected hereunder.
 4. System of empty conduits, outlet boxes and cable tray for telephone, computer and other communication systems.
 5. Modification of existing Fire Alarm System and control center.
 6. Exit and emergency lighting systems.
- B. The following work is not included in this Division:
 1. Heating, ventilating, and air conditioning equipment and all associated motors and magnetic motor starters.
 2. Plumbing equipment except as specifically indicated.
 3. Control, interlock, and internal equipment wiring regardless of voltage.
 4. Cable, terminals, instrument wiring, and instruments for telephone, computer and other communication systems unless specifically addressed by other sections of the specification.

1.5 DRAWINGS AND SPECIFICATIONS

- A. The drawings are diagrammatic and indicate the general extent, character and arrangement of equipment, fixtures and conduit and wiring systems. If any departures from the contract drawings are deemed necessary, submit details of such departures and

the reasons therefore as soon as practicable after award of contract to the Engineer for approval. Make no such departures without prior written approval of the Engineer.

- B. It is the intention of these specifications and drawings to fully cover all work and materials for a complete, first-class electrical installation, and any devices such as pull boxes and disconnect switches, usually employed in this class of work, though not specifically mentioned or shown on the drawings or in this specification, but which may be necessary for the satisfactory completion of the work, shall be furnished and installed by the Contractor as a part of his total work under this Division. Consult the specifications and drawings of all other trades and perform all electrical work required therein. Cooperate with all other contractors or subcontractors to furnish complete workable systems.
- C. In case of conflicting information on the drawings and/or in the specifications, the proper interpretation shall be made by the Engineer.
- D. Disagreements occurring between trades covering various phases of the work shall be referred to general Contractor for final decision.
- E. Changes and additions to scope of the work under this contract shall be submitted to the Engineer and his written approval obtained before proceeding with the changed work.
- F. During construction, the Electrical Subcontractor shall keep an accurate record of all deviations between the work as shown on the contract drawings and that which is actually installed. He shall secure a set of blue line prints of the electrical drawings for this purpose, and note changes thereon with red marks, in a neat and accurate manner, thus making a complete record of all changes and revisions in the original design which exist in the completed work. The cost of furnishing above prints and preparing these record drawings shall be borne by the subcontractor, and shall be included in the contract price. When all revisions have been shown on these prints to indicate the work as finally installed, the prints shall be delivered to the Engineer, before final payment.

1.6 PERMITS, INSPECTION AND TESTS

- A. The right is reserved to inspect and test any portion of the installation/equipment during the progress of its erection. Test all wiring for continuity and grounds before connecting any fixtures or devices. Perform insulation resistance tests on wiring #6 or larger. Test the entire system when the work is finally completed to insure that all portions are free from short circuits and grounds. Provide all equipment necessary to conduct the above tests.
- B. Secure and pay for all required permits and inspections. Inspection certificates from local authorities having jurisdiction shall be delivered to the Owner before final payment.

1.7 SUBMITTALS

- A. Submit Shop Drawings, Product Data and Samples within thirty (30) days of award of contract and in accordance with the General Conditions and Supplementary Conditions. Review of submittals by the Engineer and any associated action taken by the Engineer does not relieve the contractor of any requirements set forth by the contract documents. Submittals are required for the following items if and only if those items are specified herein.

- 1. Panelboards

2. Switchboard
3. Transformers
4. Lighting Fixtures and Occupancy Sensors
5. Transient Voltage Surge Suppression (TVSS)
6. Fire Alarm System Components
7. Any Special Systems as specified herein (i.e. Access Control, CCTV, etc.)

B. Submittals shall contain:

1. The date of submission and of any previous submissions.
2. The project title and number.
3. Contract or project identification.
4. The names of:
 - a. Contractor.
 - b. Supplier.
 - c. Manufacturer.
5. Identification of the product, and specification section.
6. Field dimensions, clearly identified as such.
7. Relation to adjacent or critical features or materials.
8. Applicable standards.
9. Identification of deviations from Contract Documents.
10. Identification of non-complying features and reason for the non-compliance. The reason shall be specific in nature.
11. Identification of revisions on resubmittals.
12. Contractor's stamp, initialed or signed, certifying to review of submittal, verification of products, field measurements and field construction criteria, and coordination of the information within the submittal with requirements of the work and of Contract Documents.

C. SUBSTITUTIONS

1. For a period of 10 days after Contract date, Engineer will consider written requests from Contractor for substitution of products.

2. Submit a separate request for each product, supported with complete data, with drawings and samples as appropriate, including:
 - a. Comparison of the proposed substitution with that specified.
 - b. Changes required elsewhere because of the substitution.
 - c. Effect on the construction schedule.
 - d. Cost comparison of the substitution and product specified.
 - e. Availability of maintenance service, and replacement parts.
3. The Engineer shall be the judge of the acceptability of the proposed substitution.
4. A request for a substitution constitutes a representation that the Contractor:
 - a. Has investigated the proposed product and determined that it is equal to or superior in all respects to that specified.
 - b. Will provide the same warranties or bonds for the substitution as for the product specified.
 - c. Will coordinate the installation of an accepted substitution into the work, and make such other changes as may be required to make the work complete in all respects.
 - d. Waives all claims for additional costs, under his responsibility, which may subsequently become apparent.

PART 2 - PRODUCTS

2.1 MANUFACTURING STANDARDS

- A. Materials shall be new and approved and labeled by UL wherever standards have been established by that agency. Defective equipment or equipment damaged in the course of installation or test shall be replaced or repaired in a manner meeting the approval of the Engineer. Materials to be furnished under this specification shall be the standard products of manufacturers regularly engaged in the production of such equipment and shall be the manufacturer's latest standard design. All items of the same type and rating shall be identical.

2.2 TRADE NAMES

- A. Unless specifically identified otherwise, manufacturers' names and catalog numbers indicated herein and on the drawings are not intended to be proprietary designations. They are to indicate general type and quality of materials and equipment required. Equipment and materials by other manufacturers which in the opinion of the Engineer are of equal quality and which will produce the same results with regard to both their ability to perform the required technical functions as well as to their appearance in the specific location on this project will be considered.

2.3 MOTORS AND EQUIPMENT

- A. All motors shall have disconnecting means, controller and thermal overload protection. All three phase motors shall have power loss, phase outage, and phase reversal protection features.
- B. Provide motors, controllers, integral disconnects, and contactors with their respective pieces of equipment. Motors, controllers, integral disconnects, and contactors shall conform to the requirements defined under the electrical provisions of the specifications. Extended voltage range motors shall not be permitted. Control voltage for controllers and contactors shall not exceed 120 volts nominal. When motors and equipment furnished are larger than sizes indicated, the cost of additional electrical service and related work shall be included under the section that specified that motor or equipment. Where fuse protection is specifically recommended by the equipment manufacturer, provide fused switches in lieu of non-fused switches indicated.
- C. Provide internal wiring for components of packaged equipment as an integral part of the equipment. Provide power wiring and conduit for field-installed equipment under the electrical provisions of the contract. Control wiring and conduit shall be provided under the section specifying the associated equipment. Wiring and conduit for power systems and control systems shall conform to the requirements defined under the electrical provisions of the specifications.

2.4 ELECTRICAL SERVICE

- A. Provide modification to the existing electrical service as indicated. All arrangements shall be as indicated with proper extension, terminations, provisions and necessary materials for final connections by the local power company. Service and all metering shall be provided in accordance with the latest regulations of the local power company. The local power company may provide the meter and current transformers and may participate in the cost of supplying service to the building. Consult the local power company and determine limit of this participation. The bid on electrical work shall reflect this participation except that any charges which the local power company proposes to make for supplying service will be paid directly by Owner and will not be part of this contract.
- B. Short circuit ratings for all panelboards, main disconnect switches, etc. shall be suitable to accommodate the Power Company's available fault current.

2.5 TEMPORARY ELECTRICAL SERVICE

- A. Reasonable amounts of electricity will be made available to the Contractor for the project. The Contractor shall be responsible for extending the electricity to the specific required locations within the project.

2.6 GROUNDING

- A. The entire electrical system, including equipment frames, conduit, switches, controllers, wireways, neutral conductors, and all other such equipment shall be permanently and effectively grounded in accordance with the NEC. Ground rods shall be copper clad steel, 3/4" diameter by 10'-0" long. Grounding of each transformer secondary shall be provided and each shall be considered as a separate service ground. Provide a separate ground conductor in all branch circuit conduits sized in accordance with the N.E.C. Provide

minimum #6 ground conductor in conduit from the building main service ground to the telephone backboard.

PART 3 - EXECUTION

3.1 SCHEDULE OF WORK

- A. The schedule of the electrical work shall be arranged to suit the progress of work by the other trades and shall in no way retard progress of construction of the project.
- B. Work under this Division shall proceed in advance of the work of others whenever possible, eliminating all cutting and patching. When such procedure is impossible, cutting and patching shall be done in an approved manner. Cutting shall not endanger structural integrity in any way. Patching shall exactly match contiguous work. Actual work of cutting and patching of existing surfaces shall be performed by the subcontractor who originally prepared these surfaces, e.g., cutting and patching of masonry wall will be performed by the masonry subcontractor. Costs of such cutting and patching shall be borne by the Electrical contractor. Cutting shall be carefully done and damage to building, piping, wiring or equipment as a result of cutting shall be repaired by skilled mechanics of trade involved.

3.2 STORAGE AND MATERIALS

- A. Space will be assigned to the Contractor by the Owner for the storage of materials. This Contractor will be responsible for the protection and safekeeping of materials, tools, and equipment. All materials and equipment shall be kept in its assigned place until the time of its installation. Excess materials, dirt and refuse shall be promptly removed from the work site.

3.3 LABELING OF EQUIPMENT

- A. All panelboards, cabinets, transformers, safety switches, motor disconnect switches, and motor controllers shall be identified by machine engraved laminated plastic designation plates permanently attached thereto with self-tapping screws or rivets. All component parts of each item of equipment or device shall bear the manufacturer's nameplate, giving name of manufacturer, description, size, type, serial and model number and electrical characteristics in order to facilitate maintenance or replacement. The nameplate of a subcontractor or distributor will not be acceptable. Self-adhesive, plastic laminate labels are not acceptable.
- B. All switchboards, panelboards, industrial control panels, and motor control centers shall be field marked to warn personnel of the potential for Arc Flash. Labels shall state "WARNING – ARC FLASH AND SHOCK HAZARD APPROPRIATE PERSONAL PROTECTIVE EQUIPMENT (PPE) REQUIRED".

3.4 OTHER TRADES

- A. Excavation shall be performed in accordance with the section of these specifications which cover excavating, filling and backfilling.
- B. Concrete work shall be performed in accordance with the section of these specifications which cover concrete.

- C. Painting shall be performed in accordance with the section of these specifications which cover painting. Paint all exposed conduit as well as cabinets and related items which are not supplied with a factory finish. Touch up all factory finishes damaged during installation or by adjacent construction work.

3.5 COORDINATION

- A. Cooperate and coordinate efforts with all Contractors on the project. This is especially important in determining exact locations of all switches, receptacles and lighting fixtures. Arrange lighting fixtures in accordance with the architectural reflected ceiling plans unless otherwise indicated. Coordinate lighting fixture locations with grilles, diffusers, access panels, etc. Verify ceiling and wall construction and material prior to ordering lighting fixtures or other devices to ensure proper fixture or device is furnished to match construction. This verification must be executed regardless of information placed on the drawings. Any cost incurred which in the opinion of the Engineer, could have been avoided by this step shall be the responsibility of the Contractor. Coordinate switch locations with thermostats, control switches, etc.
- B. Carefully check space requirements with the other subcontractors to insure that electrical equipment can be installed in the spaces allotted for them. Sufficient access and working space shall be provided and maintained about all electrical equipment as required by the National Electrical Code. Consult all applicable drawings for details. Where interferences occur and work must be relocated, relocate without additional cost.
- C. No conduit, outlet box, conduit stub-up, or any other electrical devices shall be installed until the exact location has been determined by the coordinated effort of all Subcontractors and other parties concerned. Any relocating of devices or cutting or patching which becomes necessary due to improper coordination shall be done at this Contractor's expense.
- D. Determine electrical requirements of other Divisions in order to fully understand wiring, and provide as required for complete and satisfactory operation of project. Make connections for other Divisions where indicated.
- E. Obtain approved shop drawings showing wiring diagrams, connection diagrams, roughing-in and hookup details, from other involved contractors for all equipment and comply therewith.

3.6 GUARANTEE OF WORK

- A. Contractor guarantees by his acceptance of the contract that all work installed is free from any and all defects in workmanship and/or materials, and that the apparatus will develop capacities and characteristics specified, and that if, during the period of one year or as otherwise specified, from date of certificate of completion and acceptance of the work any such defects in workmanship, material or performance appear, he will, without cost to the Owner, remedy such defects within a reasonable time to be specified in notice from Engineer. In default thereof, the Owner may have such work done and charge cost to Contractor. Equipment guarantees from date of "start-up" will not be recognized.
- B. Comply, also, with the General Conditions and the Supplementary Conditions and the applicable Sections of Division 1 General Requirements.

- C. Provide service for the installation for one year from date of final acceptance. This shall include all emergency service and adjustment. Provide evidence upon request by the Engineer that a factory authorized local service organization is in existence to service and furnish spare and replacement parts for all equipment under this Division of the specifications.
- D. Compile and assemble and provide all shop drawings, maintenance manuals, operation manuals and warranties in a separated set of vinyl covered, three ring binders, tabulated and indexed for easy reference.

3.7 CLEANING

- A. Refer to the Division 1 Section "PROJECT CLOSEOUT" or "FINAL CLEANING" for general requirements for final cleaning.
- B. Clean all light fixtures, lamps and lenses prior to final acceptance. Replace all inoperative lamps.

END OF ELECTRICAL GENERAL PROVISIONS